Space Weather Forecast

Issued on Thursday, 28 December 2023 at 13:20 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Risk of G1/Minor or perhaps G2/Moderate geomagnetic storm on day 1 (28 Dec). Slight chance of R1/Minor Radio Blackouts.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with only minor Common-class flares observed. There are currently seven sunspot regions on the visible disc. Only one shows evidence of minor magnetic complexity, this resides in the southeast. The largest spot appears simple and resides in the southwest. No new Earth-directed Coronal Mass Ejections (CMEs) were seen in imagery, although numerous potential sources remain in the form of many 'filaments' (arcs of plasma) on the disc.

Solar Wind / Geomagnetic Activity: Solar winds were slightly elevated throughout the period. The Interplanetary Magnetic Field was weak, while the north-south component was positive and weak. Geomagnetic activity was Quiet (Kp 0-1) through the period.

Energetic Particles / Solar Radiation: No solar radiation storms were observed, though proton flux levels were occasionally raised very slightly above normal background.

Four-Day Space Weather Forecast Summary

Solar Activity: Low activity is likely to continue, with a slight chance of isolated Moderate-class X-ray flares.

Solar Wind / Geomagnetic Activity: Two potential coronal mass ejection arrivals are expected on day 1 (28 Dec), but with great uncertainty in timing due to their potential interaction. Solar wind speeds will likely return to background levels later day 2 or day 3. Coronal hole 86 may give a high speed stream later on day 4 (31 Dec), with speeds reaching Elevated or Strong.

Geomagnetic activity will probably be Quiet at first, though an increase is likely in the event of one or more coronal mass ejection arrivals. This is likely to give an increase to Active to G1/Minor Storm conditions on day 1, with a chance of G2/Moderate Storm intervals. Activity should slowly tail off through day 2 (29 Dec), becoming largely Quiet on day 3 (30 Dec). Unsettled to Active conditions are then possible later on day 4 should we see the high speed stream arrive.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, but there is a very slight chance of reaching S1/Minor Storm levels should there be any larger flares.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	20	1	10
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	20	20	20	15
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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